VIII. Data Analysis

A. Information & Fact Sources

Interviews were conducted with the following groups:

- Radiation Protection Specialists (in-house and contract) - D23
- Radioactive Material Shipping Coordinators - D14
- ALARA Planner - D23
- Waltz Mill Personnel - D3
- Radiation Protection department supervisors - D23
- Extent of Cause Interviews - D84

The following data sources were used to obtain information in support of this root cause evaluation:

- Fleet Procedures - D55, D61, D64, D65, D67, D87, D95,
- Site operating procedures (MNGP and PINGP) - D11, D13, D18, D19, D25, D29, D36, D37, D38, D39, D40, D41, D42, D43, D44, D45, D46, D85, D86, D88, D89, D90, D91, D92, D93, D94, D96, D105, D106,
- Industry operating experience - D52, D53, D66
- Photographs of fuel sipper, components and shipping container - D27
- Vendor Radiation Surveys - D1, D8, D10, D12, D35
- Site Radiation Surveys (as listed in references section) - D4, D5, D9, D15, D17
- Written Statements from Individuals Involved - D24, D31, D34
- Extent of Condition AR Search - D83
- Meter Calibration Data Sheets - D69, D70, D71, D72, D73, D74
- Security logs – D20
- Code of Federal Regulations – D16, D107, D108, D112
- Communications (e-mail and phone conversations) with various site and fleet personnel – D32, D21, D6, D7, D110
- Root Cause Informational Literature – D30
- SOMS Narrative Log – D22
- NRC web site – D47, D48, D49, D50, D51, D62, D63, D104
- ALARA planning documents for 2R25 fuel sipping – D54, D68
- Vendor description of services and equipment– D56, D59, D60
- Shipping Documentation – D57, D58,
- Site web page – D75
- OE evaluation records and guidelines– D97, D109
- Failure mode tables – D98
- Calibration and linearity checks of instruments – D103
- Evaluation from Industry Expert of survey data – D101, D102
- Communication between Westinghouse and the state of Pennsylvania – D100
- 2R25 scope change record – D111

B. **Evaluation Methodology & Analysis Techniques**

Data for this evaluation was collected primarily by interviews, statements, records reviews, photographs, investigation and surveys of the shipping container at Waltz Mill by the field team members and Westinghouse staff.

Analysis of the data was performed using the following methods:

- Task Analysis (Attachment 1)
- Barrier Analysis (Attachment 2)
- Change Analysis (Attachment 3)
- Event and Causal Factors Charting (Attachment 5)
- Why Staircase Analysis (Attachment 6)
- Evaluation of Safety Culture Impacts (Attachment 7)

C. **Data Analysis Summary**

Data analysis Summary - The data analysis types were selected based on the type of issue the root cause evaluation was to evaluate.

The following evaluation techniques were used to identify root and contributing causes from information collected during interviews and reference documents:

- Task Analysis: This analysis was used to determine the appropriate tasks for a 'typical' radioactive material shipping program. The analysis also was used to determine, later, which actions were not appropriate and how the actions contributed to the root causes.

- Event and Causal Factor Charting: This method produced a visual timeline of the event from the time the latest relevant OE was received and distributed for information only purposes at Prairie Island to realization that a DOT radioactive material shipment regulation had been exceeded. Root causes (event would not have occurred without these in place), contributing causes (worsened the event), and inappropriate actions (who did what contrary to a requirement) are identified on the chart. A noteworthy feature of the chart is the period of time between 10/29/08 and 10/30/08 that was established as the time during which the cable containing the discrete particle shifted within the shipping container.

- Why Staircase Analysis: Each inappropriate action identified on the event and causal factor chart was further evaluated using why staircases in order to better understand the underlying reasons. "Why" was asked repeatedly until the point at which excuses began to replace legitimate reasons.

- Evaluation of Safety Culture Impacts: this evaluation was used to determine if there were any human performance issues identified in the evaluation of the rad shipping issue. The results of this evaluation were used as input to a site human performance evaluation to determine if there are human performance issues at the site that require broader scope corrective actions. The HU evaluation (other than the initial input) was carried out separately from the RCE evaluation of the rad shipping issue.

- Barrier Analysis: This analysis was framed from the perspective of the Prairie Island picture of excellence and was used to determine departures from standards. In this analysis, it became apparent that the requirement that a survey find all discrete particles was not proceduralized and would not provide an effective barrier to prevent the rad shipping issue from occurring again.

- Change Analysis: This analysis was used to determine if there were any initiating issues that were not properly identified (fuel sipper design) and also, if there were any changes in methodologies or worker practices that may be needed to provide barriers in the future (watching the loading of containers, wrapping equipment with possible discrete particles and loose parts).

- Analysis of Procedures - This analysis was completed by a contract facility familiar with radioactive material shipping regulations and requirements. This evaluation determined that the industry typically relies on personal knowledge and also that there was little or no connection between what RPTs and RWSCs do in their respective procedures. This communication disconnect represented several failed barriers.

D. **Failure Mode Summary**

The following codes were applied to the root cause and contributing causes:

Inappropriate Actions are coded for Human Error Type (GEMS), Human Performance Failure Mode (HP), Process Related Failure Mode (PR) and Organizational / Management Failure Mode (OM) if applicable. Root Causes and Contributing Causes are coded for PR and OM only (due to not being individual in nature)

IA1 – Workers did not package the fuel sipper to prevent shifting

GEMS – Knowledge Based

HP – K7 - Flawed Analytical Process or Model, Insufficient knowledge of codes, standards, design basis, licensing basis, regulations, etc. needed to perform the task.

PR – AR1 - Critical Actions Not Verified, Critical actions required to successfully perform a task are not verified within the process.

RR6 - Methods Not Clearly Described, Action(s) are required by the document or instruction, but the method to accomplish the actions is not clearly specified by the document or instruction.

OM – F6 - Inadequate Program Management, Inadequate oversight of critical work processes to ensure they function smoothly and effectively.

IA2 – RWSC did not verify survey was adequate for shipping

GEMS – Rule Based

HP – J5 - Inadequate Verification, Insufficient verification of the facts, and is usually based upon inaccurate information or a lack of information.

PR – AR5 - No Acceptance Criteria, No acceptable performance parameters have been established for the process, procedure or task.

OM – F6 - Inadequate Program Management, Inadequate oversight of critical work processes to ensure they function smoothly and effectively.

IA3 – Shipping was not specifically addressed in WO 367253 as required by FP-RP-JPP-01, step 5.5.

GEMS – Knowledge Based

HP – K2 Unfamiliar or Infrequent Task, The shipping of fuel handling equipment is an infrequent evolution.

PR – RR2 Actions Not Clear, Work order was not specific in regards to sending the fuel sipping tools back to Westinghouse.

OM – F4 Inadequate Planning, Shipping the sipping equipment offsite should have been included in the work order.

CC1 Industry Experience has not been effectively incorporated into the RMSP.

PR – AR4 - No Process Monitoring, There is no established means of monitoring the success or failure of the process.

OM – F6 - Inadequate Program Management, Inadequate oversight of critical work processes to ensure they function smoothly and effectively.

C5 - Inadequate Self Assessment, A failure to continually encourage feedback, or look at better ways to perform.

CC2 The training and certification programs for RP personnel who perform shipping related activities do not meet industry standards.

PR – RR5 - Actions Not Tied to Another Process When Necessary, The action(s) contained within one document or instruction does not reference supporting documents or instructions when necessary.

OM – F4 - Inadequate Planning, Deficiencies in determining what work must be done, by whom, when, and how long it will take.

RC1 – Radiation Protection and Chemistry procedures do not describe the methods required to successfully evaluate, package, and ship materials in accordance with 49CFR173 and 10CFR71.

PR – RR6 - Methods Not Clearly Described, Action(s) are required by the document or instruction, but the method to accomplish the actions is not clearly specified by the document or instruction.

OM – F6 - Inadequate Program Management, Inadequate oversight of critical work processes to ensure they function smoothly and effectively.

RC2 – The significance the site has assigned the Radioactive Material Shipping Program (RMSP) does not align with the potential adverse consequences.

PR – AR5 - No Acceptance Criteria, No acceptable performance parameters have been established for the process, procedure or task.

OM – F3 - Inadequate Prioritization, Deficiencies in determining which work takes precedence over other work.

IX. Root Cause and Contributing Causes

The evaluation was completed with an overall determination the Radioactive Materials Shipping Program is less than adequate.

The term 'radioactive material shipping program' is defined as oversight of those events involving the surveying, packaging, and loading of radioactive material into containers, as well as the loading and strapping of the containers on transport vehicles, and confirmatory surveys of loaded equipment, and travel on the public transportation system, through confirmatory surveys by the receipt organization. These actions must be completed every time a radioactive material shipment is completed and sent out from Prairie Island. When receiving radioactive material shipments, the shipping program is responsible for the initial receipt inspections of the material, confirmatory surveys, and adequate disposition of the shipping container to an appropriate storage area.

The root causes of the radioactive material shipment issue have been identified as:

RC1. Radiation Protection and Chemistry procedures do not describe the methods required to successfully evaluate, package, and ship materials in accordance with 49CFR173 and 10CFR71.

Specific examples of this include:

1. Radiation Protection Procedures (RPIPs) and Radioactive Material Shipping Procedures (D11) do not coordinate activities between the two programs
2. There is a heavy reliance on RMSP personnel knowledge instead of well defined approved procedures
3. Step 6.9 of D11.7 is vague with little other guidance in approved documentation on how to evaluate, package, and load rad materials.

There were no prescribed steps to load the shipping container or survey the equipment going into the container, as the RMSP is typically maintained outside the work (outage and on line) process.

RC2. The significance the site has assigned the Radioactive Material Shipping Program (RMSP) does not align with the potential adverse consequences.

Specific examples of this include:

1. Risk perception did not match real risk.
2. There is a heavy reliance on an individual instead of the program.
3. Corrective actions from previous similar events were not effective.
4. Risk significant RMSP evolutions are not covered by the work control process – no tasks or priorities established.
5. There was no supervisory oversight of the shipping evolution.

The RWSC was the signatory authority for rad shipments, regardless of material, destination, activity, or risk. There were limited programmatic checks and balances to ensure important decisions were the responsibility of a single decision maker.

Figure 1: RMSP schematic representation

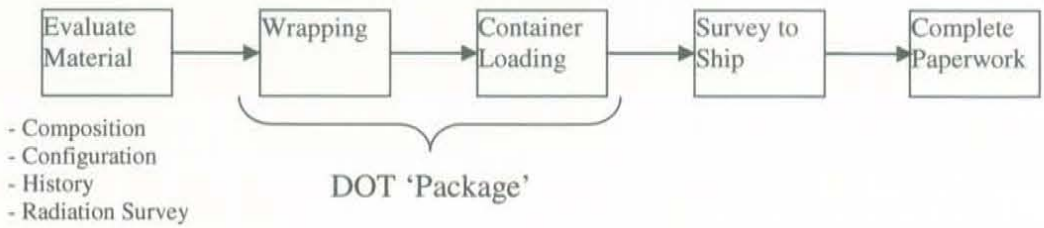

Figure 1 provides graphical detail of 'typical' RMSP components involving a shipment. The historic involvement of the RMSP at PI has been in the last two activities (survey of the shipment and completing the necessary paperwork, with heavy reliance on the radiation protection group for the first three activities. The radiation protection group focus in the first three activities was not appropriate to address all RMSP requirements, due to other priorities and a lack of a clear understanding of RMSP requirements.

Levels of supervisory involvement and approvals must be commensurate with the risk involved with each shipment. There was no guidance in place to determine who or what level of involvement was necessary for a given shipment.

During this evaluation, there was a lot of focus on the initial survey of the equipment. The inappropriate survey represents one of the initial barriers that could have prevented the event from occurring. Detailed analysis, including why staircases and event and causal factor charting, determined the inadequate survey was an inappropriate action in the chain of factors that led up to the event. These analyses were completed to determine causal factors that were considered when developing the root and contributing causes.

The root cause evaluation identified the following contributing causes:

CC1 **Industry Experience has not been effectively incorporated into the RMSP.**
Specific examples of this include:
1 Corrective actions as a result of OE evaluations are not effectively incorporated.
2 Industry benchmarking is not used to evaluate program health.

CC2 **The training and certification programs for RP personnel who perform shipping related activities do not meet industry standards.**
Specific examples of this include:
1 Interviews identified there is no formal rad shipping qualification above the minimum DOT requirements for RP technicians observing packaging evolutions.
2 Some personnel performing RMSP activities were not familiar with RMSP requirements and are not qualified 49 CFR, subpart H.

3 The RMSP has no provisions for ensuring qualifications of personnel involved in the packaging of rad material shipments per 49 CFR Subpart H.
4 There are no site programs that are utilized for tracking 49 CFR, subpart H qualifications.

Corrective Actions

Corrective Actions to Restore (broke-fix) and Interim Corrective Actions (mitigation)

1. Stop work order from Xcel Energy CNO to prevent any further shipment of radioactive materials from Prairie Island and Monticello (complete).
2. A quarantine of all rad shipping procedures (D11.XX series) was processed (Mitigation) (complete).
3. The fleet RP manager and an RP technician were dispatched to Waltz Mill, PA to verify and gather information (complete).
4. An initial RP evolution risk matrix was issued to provide guidelines to RP management staff regarding risk significant evolutions in the Radiation Protection field and providing levels of oversight, approval and actions required (complete).
5. Fleet (internal) Operating Experience was distributed (complete).
6. A root cause team was formed to perform the evaluation regarding this issue (complete).

Corrective Actions to Prevent Recurrence (CAPRs) and Effectiveness Reviews

Cause to Action Matrix

Cause / Problem	Corrective Action	Owner / Due Date
RC1 – Radiation Protection and Chemistry procedures do not describe the methods required to successfully evaluate, package, and ship materials in accordance with 49CFR173 and 10CFR71.	CAPR01157726-06: Upgrade radioactive material shipping procedures D11.7, D11.11, D11.6, D11.13, and D11.14 as appropriate to provide the following specific information: - Define involvement levels for RWSC personnel for risk significant shipment evolutions - Define supervisory approval requirements.	Owner: RPM Due Date: 2/6/09 Completed: 1/29/09
	CAPR01157726-07: Upgrade radioactive material shipping procedures D11.7, D11.11, D11.6, D11.13, and D11.14 as appropriate to provide the following specific information: - Guidance on appropriate blocking and bracing, and use of small diameter probe surveys during risk significant shipment activities. - delete D11.10, D11.12, D11.2, D11.4, D11.8, and D11.9 - Require a RWSC assistant trained individual (minimally) be present during packaging of all risk significant equipment scheduled to be shipped. - Require a RWSC assistant trained individual (minimally) be present during loading of shipping containers with materials that contain risk significant equipment scheduled to be shipped - If a radioactive package contains high risk items, then ensure the shipment uses closed transport as the method of shipment.	Owner: RPM Due Date 2/6/09 Completed: 1/29/09
	CAPR01157726-13: Generate RPIP 1303 (Packaging of Radioactive Material): Any materials that have a possibility of containing a discrete particle be labeled on the package or on the RAM tag. Add a note to the precautions section that discrete particles be annotated on the wrapping or on the RAM tag to ensure shippers are notified of possible discrete particles. Provide guidance for discrete particles in the procedure.	Owner: RPM Due Date: 2/6/09 Completed: 1/29/09

Cause / Problem	Corrective Action	Owner / Due Date
RC1 – Radiation Protection and Chemistry procedures do not describe the methods required to successfully evaluate, package, and ship materials in accordance with 49CFR173 and 10CFR71.	CA 01157726-22: Revise RPIP 1122 to require: Change any references to hot particles to discrete particles. Any materials being packaged that have been identified as having discrete particles are labeled on the package or tag as containing discrete particles. Identify areas where discrete particles may exist (refueling cavity, spent fuel pool, primary system, and discrete particle areas) Require any equipment that may have discrete particles that is being surveyed and may be shipped require the survey be sent to the RWSC and the RWSC be notified prior to completing the survey. Reference D11 procedures	Owner: RPM Due Date: 2/6/09 Completed: 1/28/09
RC1 – Radiation Protection and Chemistry procedures do not describe the methods required to successfully evaluate, package, and ship materials in accordance with 49CFR173 and 10CFR71.	CA 01157726-24: Revise RPIP 1122 to require the use of a meter with an audible response when surveying for discrete particles.	Owner: RPM Due Date: 02/28/09 Completed: 2/20/09
RC2 – The priorities that the site has given the Radioactive Material Shipping Program do not align with the potential adverse consequences of program failures	CA01157726-30: Revise FP-WM-PLA-01, Work Order Planning Process to address rad shipping tasks. For example: - Section 5.10, item #21 – "Add support tasks or resources as necessary. For example, a new/separate task for shipping radioactive materials." - The Detailed Work Order Package section of Attachment 2 – "Work that has a high risk due to personnel safety or radiological exposure (ALARA tasks), including shipping of radioactive materials"	Owner: Director Fleet Ops Standardization Due Date: 10/8/09

Cause / Problem	Corrective Action	Owner / Due Date
RC2 – The priorities that the site has given the Radioactive Material Shipping Program do not align with the potential adverse consequences of program failures	CA01157726-31: Revise QF2010, to address radioactive material shipping tasks. For example: Add an item to address shipments designated as Radioactive Material Quantities of Concern as high risk shipments.	Owner: Fleet RPM Due Date: 10/8/09

Cause / Problem	Corrective Action	Owner / Due Date
Extent of Cause Corrective Actions	CA01164766: Provide a reference that directs personnel to use PINGP 1400	Owner: RP Supervisor Due Date: 2/15/09 Completed: 2/3/09
	CA01164768: Submit a training request to communicate that transporting chemicals via personal vehicles is prohibited.	Owner: RP Supervisor Due Date: 3/25/09 Completed: 3/2/09
	CA01164759: Delete QCIM-R-01	Owner: NOS Supervisor Due Date: 2/15/09 Completed: 1/13/09

Cause / Problem	Corrective Action	Owner / Due Date
RC2 – The priorities that the site has given the Radioactive Material Shipping Program do not align with the potential adverse consequences of program failures	CAPR01157726-14: Add RMSP evolutions into the risk matrix by updating procedure 5AWI 15.8.0. The matrix will include, for the rad shipping category, the following fields: Moderate - Involves surveying or packaging of radioactive equipment or waste with associated dose rates ≥40% AND <80% of any applicable shipping dose rate limit. High - Involves surveying or packaging of radioactive equipment or waste with associated dose rates ≥80% of any applicable shipping dose rate limit. Involves surveying or packaging radioactive equipment or waste from the Spent Fuel Pool or Reactor Cavity, excluding intact filters or resin. Note: Risk significant is defined as Medium and High risk items. Update: Following completion of this CAPR, site procedure 5AWI 15.8.0 was deleted and replaced by fleet procedure FP-WM-IRM-01, Integrated Risk Management. Currently, the fleet procedure does not reference this CAPR. To ensure the actions taken by CAPR01157726-14 are retained in the fleet process, CAPR01157726-28 was initiated to revise QF-2010, Work Order Risk Screening Worksheet, to add details for risk determination for rad shipping activities. Additionally, CAP01185108 has been generated to ensure the CAPR is referenced in the fleet procedure and to document the potential for lost data/failure to incorporate CAPRs resulting from a RCE.	Owner: Plant Manager Due Date: 2/4/09 Completed: 1/29/09 Owner: Director Fleet Ops Standardization Due Date: 10/8/09

Cause / Problem	Corrective Action	Owner / Due Date
RC1 – Radiation Protection and Chemistry procedures do not describe the methods required to successfully evaluate, package, and ship materials in accordance with 49CFR173 and 10CFR71. RC2 – The priorities that the site has given the Radioactive Material Shipping Program do not align with the potential adverse consequences of program failures.	EFR01157726-18: Complete an effectiveness review of the rad shipping program. Effectiveness review will be completed by direct observation of a risk significant shipment by a team comprised of an industry peer and site management. The observation will observe all aspects of the shipment from planning through release from the site. Effectiveness will be determined by no significant deficiencies noted in procedure quality or evaluation of risk.	Owner: RPM Due Date: 11/01/09
	EFR01157726-19: Complete an effectiveness review of the RMSP by completing an external assessment of the program. Effectiveness will be determined by no significant deficiencies noted addressed by CAPRs of this evaluation. Specifically, this evaluation will look for significant procedure deficiencies in the RMSP, failure of the site to properly evaluate an RMSP evolution for risk, procedures changes completed, training program fully implemented and qualified personnel proficient in qualification.	Owner: RPM Due Date: 11/01/09

Cause / Problem	Corrective Action	Owner / Due Date
CC1 – Industry Experience has not been effectively incorporated into the RMSP.	CA01157726-12: Monitor Operating Experience evaluation methods as follows: All OE evaluations applicable to the RMSP will be reviewed by RPCM on an ongoing basis to determine if appropriate applicability determinations are being completed.	Owner: RPM Due Date: 1/11/10
	CA01157726-16: Monitor Operating Experience review and evaluation methods as follows: - OE screening packages will be reviewed by an RP supervisor on an ongoing basis to determine if RMSP applicable OE is properly screened for application to PI. Review will be provided to department OE liaison or site OE coordinator.	Owner: RPM Due Date: 1/11/10
	CA01157726-17: Add requirements for: - A focused self assessment for the rad shipping program at a frequency of every three years. This is in addition to any other RP assessment requirements. - A periodic benchmarking for the rad shipping program at a frequency of every three years.	Owner: PA Supervisor Due Date: 2/28/09 Completed: 2/27/09
	EFR01157726-29: Conduct an effectiveness review of the additional OE reviews implemented under CA01157726-12 and 16. Determine if such reviews need to continue. Initiate additional corrective actions for any deficiencies noted.	Owner: RPM Due Date: 3/31/10

Cause / Problem	Corrective Action	Owner / Due Date
CC2 - The training and certification programs for RP personnel who perform shipping related activities do not meet industry standards.	CA01157726-20: Establish a training and qualification for radioactive waste shipping coordinator assistant to be a specialist position to perform tasks as described in RPIP 1303. Include requirements for 49 CFR Subpart H training. Generate a matrix which defines those activities to which Subpart H qualifications apply.	Owner: Training Manager Due Date: 5/31/09 Completed: 3/27/09
CC2 - The training and certification programs for RP personnel who perform shipping related activities do not meet industry standards.	CA01157726-25: Add steps to Rad Shipping procedures that: - Requires a comparison of equipment dose rates to shipping container dose rates. If the dose rates on the container are higher than the dose rates of the equipment placed in the container, do not ship the container until an investigation has been conducted to determine the cause. - Add a step in the Rad Shipping procedures that verifies appropriate personnel meet 49CFR172 Subpart H training requirements.	Owner: RWSC Due Date: 03/13/2009 Completed: 3/9/09

Other Corrective Actions

- CAP 1160060 This was an identified issue with procedure deficiencies noted in the D11.X series of procedures. Actions will be taken to update references, delete references to strong, tight packaging. CAP initiated prior to completion of RCE01157726. CAP screening recognized that the suggested actions were addressed by the CAPRs and CAs in the RCE. Therefore, this CAP was appropriately closed to RCE01157726.
- CAP 1161675 This CAP was to further evaluate safety culture issues identified in the RCE in areas not evaluated by the root cause to check for extent of condition. Completed 4/4/09.
- CAP 01158434 Re-post nuclear network message after root cause approved by PARB. Completed 4/28/09.
- PCR 01166814 Change D89 to remove references to deleted procedures. Completed 2/3/09.
- CAP 01185108 Document the potential for lost data/failure to incorporate CAPRs resulting from a RCE.

XI. References

Doc #	List	Date/Rev
1	HP Form 270A Rev 2 (03/04) Westinghouse Radiological Survey Record Survey No. 2008-704-SC	10/31/2008
2	CAP 01157726 PI Rad Shipment Arrives at Consignee above DOT Rad Limits	10/31/2008
3	Trip Notes from Waltz Mill	11/3/2008 - 11/14/2008
4	HP Form 270A Rev 2 (03/04) Westinghouse Radiological Survey Record Survey No. 2008-372-R5	11/4/2008
5	HP Form 270B Rev 2 (03/04) Westinghouse Radiological Survey Record Survey No. 2008-755-SC	11/14/2008
6	Memo from RPM Stopping Shipments	
7	Summary of Discussion with NRC related to Potential Greater than Green Finding	12/5/2008
8	HP Form 270A Rev 2 (03/04) Survey No. 2008-754-SC	11/13/2008
9	PINGP 258, Rev. 13 Radiation Protection Survey Record WO/Task n/a	11/3/2008
10	HP Form 1058 (01/05) Record of Monitoring on Receipt of Radioactive Materials Receiving Shipment #I-324-2008	10/30/2008
11	D11.7 Radioactive Materials Shipment - LSA/SCO/LTD Qty to a Licensed Facility Shipment #08-069	10/29/2008
12	Radioactive Shipment Receipt Survey I-324-2008	11/3/2008
13	D11.7 Radioactive Materials Shipment - LSA/SCO/LTD Qty to a Licensed Facility	Rev. 15
14	Interview Notes - Rad Shipper	
15	PINGP 258 Radiation Survey Record, Verification of Dose Rates on Fuel Sipping Package for Shipment #08-069 (Dated 29-OCT-08 09:00) for WO 366884	10/29/2008
16	49CFR Part 173 Radiation Level Limitations and Exclusive Use Provisions 173.441	
17	PINGP 258, Rev 13 Radiation Protection Survey Record WO/Task 00367253	10/23/2008
18	RPIP 1319 Loading LSA Boxes/Sea-land Containers	Rev. 10
19	5AWI 3.6.4 Notifications Regarding Plant Media Sensitive Events or Conditions	Rev. 14
20	History of Logged Messages for All Persons	10/29/2008
21	E-mail regarding Rad Shipper training program	12/19/2008

Doc #	List	Date/Rev
22	Radiation Protection SOMS Narrative Log Search	10/23/08 to 10/29/08
23	Interview Notes - RPTs, others	
24	Trucker Statement	11/7/2008
25	RPIP 1135 RWP Coverage	Rev. 19
26	WO 367253 - West: SIP Fuel Assemblies to support Cask Loading	
27	Pictures from Waltz Mill	11/3/08 - 11/4/08
28	PI Shutdown log unit 2	11/2/2008
29	RPIP 1122 Hot Particle Program	Rev. 13
30	Commonly Seen Cause & Effect Relationship	
31	E-mail Westinghouse to Southern Pines Trucking & PI	10/31/2008
32	E-mail from Xcel Fleet RPM to NRC, dated Thursday, November 06, 2008 7:13 AM	11/6/2008
33	E-mail to PI on isotopic analysis	11/14/2008
34	E-mail from Westinghouse to PI	10/31/2008
35	Westinghouse Nuclear Services Departmental Procedure WM-HP-RAM-514 Rev 0	
36	D11 Radioactive Material Shipment Rev 16	6/19/2007
37	D11.6 Radioactive Materials Shipment - N.O.S. - Other than Irradiated Fuel - Not Exceeding HRCQ Rev 11	3/29/2006
38	D11.10 Mixed Low-Level Radioactive and Hazardous Waste (Mixed LLW) Shipment Rev 8	3/29/2006
39	D11.11 Radioactive Materials Shipment - LSA/SCO/LTD Qty in Exclusive Use Vehicle - to Licensed Processing Facility Rev 10	4/10/2006
40	D11.13 Radioactive Materials Shipment - Certified Containerized Waste to Envirocare of Utah Rev 1	4/12/2006
41	Radioactive Material Shipment - LLRW to Bulk Waste Disposal Facility of Envirocare of Utah Rev 1	4/12/2006
42	RPIP 1118 Conducting Radiation Surveys Rev 16	5/19/2008
43	MNGP 4AWI-08.05.02 Radioactive Material Shipping Rev 11	
44	MNGP form 5620 Instructions for Maintenance of Exclusive Use of Controls Rev 6	
45	MNGP form 5877 Radioactive LSA/SCO Shipment - in Exclusive use Vehicles Rev 5	
46	MNGP form 5860 Master Radioactive Material Shipping Procedure	

Doc #	List	Date/Rev
47	NRC Detailed ROP Description	
48	0308 Appendix D Technical Basis for Public Radiation Safety Significance Determination Process	6/25/2004
49	10CFR71.47 External Radiation Standards for All Packages	
50	NRC Inspection Manual Inspection Procedure 95003	1/17/2002
51	NRC Appendix D Public Radiation Safety Determination Process	2/12/2008
52	EA-06-253, Vermont Yankee NPS NRC inspection Report 05000271/2006011	11/7/2008
53	Operating Experience Documents	
54	ALARA Planning for 2R25 Fuel Sipping	12/12/2008
55	FP-PA-OE-01 Rev 10 Attachment 7 Expectations for Using OE	10/31/2008
56	Westinghouse Vacuum Canister Sipping Services brochure	5/1/2008
57	Shipping Bill of Lading 08-069	10/29/2008
58	SC-11-3556 Packaging Certification Documents	12/5/2007
59	11-3556-2-01 Shipping Canister Container Schematic Container Assembly SSB-300-40-7A-TRF Attachment 1 Container Final Inspection Report for Shipping Container ISB-300-4-7A/IP3-TRF	
60	11-3556-2-01 Shipping Canister Container Schematic Container Assembly SSB-300-40-7A/IP3-TRF Final Inspection Report	
61	FP-RP-JPP-01 Rev 4 RP Job Planning	11/26/2007
62	NRC Inspection Manual Chapter 0305	11/27/2007
63	NRC Inspection Manual Inspection Procedure 95002	10/16/2006
64	FP-G-DOC-03 Rev 5 Procedure Use and Adherence	7/30/2008
65	FP-PA-HU-01 Rev 6 Human Performance Program	4/24/2008
66	OE26644 Shipment of Radioactive Material Exceeds Contact Dose Rate Limit	5/7/2008
67	FG-PA-RCE-01 Rev 14 Root Cause Evaluation Manual	7/30/2008
68	RWPs associated with WO 367253	

Doc #	List	Date/Rev
69	Calibration Certificate Eberline E-600 Portable Radiation Monitor Body	8/25/2008
70	Certificate of Calibration Eberline Teletector 6112B	11/3/2008
71	PINGP 1642 Rev 0 MG Telepole Calibration Data Sheet	11/5/2008
72	Certificate of Calibration Eberline SHP-270 with E-600	9/9/2008
73	Certificate of Calibration Eberline RO-2	5/22/2008
74	Certificate of Calibration Eberline Teletector 6112B	9/5/2008
75	RP & Chem Org Chart	
76	Job Risk Assessment Matrix	
77	Things to Look at/ask at Waltz Mill	
78	E-mail Root Cause Activities	11/10/2008
79	PINGP 1112 Rev 24 RCE Pre-Job Brief Attendance	11/10/2008
80	QF-0414 Rev 5 PI Site Clock Reset - Red Sheet for CAP01157726	
81	Draft RP job risk assessment	
82	Draft evaluation of D11.7, RPIP 1319, and RPIP 1122	
83	Extent of Condition AR Searches	
84	Interview Notes - Extent of Cause	
85	QCIM-R-01 Inspection Requirements and Acceptance Criteria for RAM shipment Inspection Points	
86	RPIP 4518 Septic Tank Sampling	
87	FP-SC-RSI-04 Material Return Receipt	
88	D14.8 Regulated Waste Management	
89	D14.5 Hazardous and Non-hazardous Materials Storage, Disposal and Labeling Requirements	
90	PINGP 1400 Checklist for Hazardous Material/Hazardous Waste Shipment	
91	RPIP 3105 Preparing Oil, Fuel and Special Samples for Shipment	
92	PINGP 1409 Checklist for Shipping Hazardous Material Samples to Chestnut Service Center	
93	D74 Asbestos Containing Material Handling/Removal	
94	Xcel Waste Management Guidance Manual	
95	FP-S-SGI-01Control of Safeguards Information	
96	SIP 4.5 Firearms Inventory, Inspection, Cleaning & Maintenance	
97	RP OEE for 1/1/2007 to 12/31/2008	
98	Failure Mode Tables	
99	NRC Inspection Manual 0609 Appendix D	2/12/08

Doc #	List	Date/Rev
100	Westinghouse Email To State of Pennsylvania, dated Friday, October 31, 2008 5:52 PM	10/31/2008
101	Effective Dose Equivalent Rate from Surface of the Shipping Container	1/2/2009
102	Evaluation of Surveys of the Prairie Island Shipping Container Serial #17-0072 from Shipment #I-324-2008.	1/1/2009
103	Telepole linearity check for Radwaste shipment investigation	
104	NRC Regulatory Issue Summary 2003-04 Use of the Effective Dose Equivalent in Place of the Deep Dose Equivalent in Dose Assessments	2/13/2003
105	5AWI 15.8.0, Work Activity Risk Management	Rev 6, 3/26/08
106	RPIP 1300, Control and Tagging of Radioactive Material	Rev 13, 6/3/08
107	10CFR20.1201, Occupational dose limits for adults	5/21/1991
108	10CFR20.1301, Dose limits for individual members of the public	5/21/1991
109	OE screening guidelines	
110	Emails regarding safety significance determination	1/6/2009
111	2R25 scope change record for WO 367253	
112	40CFR190.10	7/1/2
113	ACE 00052837 lead blanket shipment to Kewaunee	6/28/01
114	D11.7 previous revisions 12, 13, 14	
115	Supporting documentation for EOC Addendum	10/15/09